AYASDI

Improving Denial Management using Machine Intelligence
Rethink Manual, Costly Denial Management Workflows

Rejected or denied claims represent 5 to 10% of hospital revenues each year\(^1\), resulting in hundreds of millions of dollars in losses. Current analytical tools provide hospitals with a high-level understanding of the sources and types of denied claims. However, these tools fall short when it comes to identifying the underlying reasons and characteristics of denied claims. The amount of data included in UB-04 forms along with associated 835 transactions create increasingly complex scenarios for individuals to analyze. As a result, medical billing teams spend a considerable amount of time and effort investigating the root causes for each denied or rejected claim. Researching, correcting, and resubmitting individual claims is an extremely manual process that does not scale. There is a tremendous opportunity for hospitals to prevent revenue loss with a deeper understanding of reasons for denied claims, using improved analytical solutions.

Ayasdi’s machine intelligence software represents an innovative analytical approach for revenue cycle management. It provides a holistic view of claims and quickly surfaces groups of similar claims that are frequently denied, along with the key characteristics and reasons for denial. Finding the precise combinations of procedures, physicians, and diagnostic codes that influence payment eligibility using conventional analytical tools is time-consuming and resource-intensive. Ayasdi’s software rapidly uncovers insights that can drive process improvements to minimize revenue loss from denied claims.

The Power of Machine Intelligence

Ayasdi’s machine intelligence software combines topological data analysis (TDA) with statistical, geometric, and machine learning algorithms to uncover all the patterns and relationships within a provider’s claims-related data. The topological summaries, generated using TDA, visualize insights and patterns in claims data that conventional analytics tools cannot bring to the surface. The software rapidly correlates and analyzes thousands of attributes (such as procedure codes, physician and payer-related information, as well as provider locations) and groups claims that are similar to reveal patterns and outliers through visual networks. It automatically lists the statistically significant characteristics of these groups of claims and explains outliers.

Hospitals benefit from using Ayasdi’s machine intelligence software to conduct a retrospective analysis of hotspots of denied claims and determine the root causes for denials. The uncovered insights help them proactively optimize their processes to prevent future denials.

Apply Machine Intelligence to Reduce Denials

**GAIN A HOLISTIC VIEW OF ALL CLAIMS**

Ayasdi’s software uses TDA to help uncover highly nuanced relationships and patterns hidden within historical claims data. The software ingests all the claims data, including UB-04 data elements and transactional information associated with the claims, and creates a visual network of all the claims based on

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a notion of similarity. Claims with similar characteristics are clustered closer together within the network, whereas claims that are less similar are further apart. Traditional reporting using dashboards and Excel sheets may show aggregate numbers, but they are unable to show the relationships between similar claims. The network can then be colored by any attribute of interest, including the payer type, denial reason category (e.g., medical necessity, pre-certification required), diagnostic and procedure codes reported in the claim, or percent of claims denied, to surface subtle patterns in the claims data.

**SURFACE UNDERLYING DENIAL PATTERNS AND HOTSPOTS**

Coloring the network by whether a claim was denied or rejected reveals hotspots, or dense clusters, of denied/rejected claims within the network. These hotspots are generated without having to input any preconceived notions of the underlying reasons for denial, allowing for a true data-first methodology. It saves analysts and medical billing specialists from having to guess and check which procedures, providers, and reason codes are in common within groups of denied claims. Ayasdi’s machine intelligence software easily identifies the subtle similarities within a group of claims. It surfaces the attributes in common along with possible reoccurring mistakes.

By drilling into a hotspot, an analyst can determine the characteristics that drive denials and that differentiate them from the rest of the claims. The software efficiently distinguishes denied claims by surfacing the unique combination of diagnostic codes, payer, and procedure attributes that characterize these denied claims. Based on these attributes, claim analysts can create profiles of claims known to have a high risk of denial.

**SPEED PAYMENT REIMBURSEMENT**

The average cost of re-working a claim is $25. With hundreds of denied claims pouring in each day, providers need an efficient way of prioritizing claims for resubmission. If a newly denied claim is recognized to have similar attributes as the claims reviewed in a hotspot, it can be quickly categorized and prioritized for correction. The reason for denial is likely to be the same, which limits the investigation effort required to determine the root cause of the denial to fix the claim. This greatly improves the efficiency of the billing team and the overall claims denial management process.

**PROACTIVELY PREVENT DENIALS**

The insights discovered by analyzing denied claims can be used to proactively improve upstream coding changes by the medical staff that will avoid future denials. Instead of evaluating individual denied claims, a

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2 Benchmarking Revenue Cycle Performance, results from the 2013 National Survey of Hospital Revenue Cycle Operations, The Advisory Board
domain expert evaluates groups of similarly denied claims and suggests process improvements using the underlying characteristics of each of these groups. By identifying, modifying, and fixing processes upstream, hospitals can minimize the number of claims that are rejected or denied.

A Major Healthcare Provider Improves Denial Management with Ayasdi’s Software

THE BACKGROUND

A significant increase in the percentage of denied claims prompted a $3 billion healthcare system to reevaluate their claims denial management processes. The provider estimated that 90 percent of denied claims fell into one of three categories: medical necessities, reauthorizations, and timely filing. However, despite well-developed Excel reporting, they were not in a position to pinpoint the exact drivers of denials. The volume of denied claims in these categories continued to rise each year. The provider recognized that they needed an advanced analytical solution to help them determine the precise reasons that resulted in a claim getting denied or rejected.

AYASDI VALUE

The provider used Ayasdi’s machine intelligence software to tackle the problem by generating hotspots from the hospital’s claims data. The software helped create precise profiles of groups of denied claims, impossible to identify with a high-level trends analysis using Excel.

Figure 2 is a visual representation of the provider’s claims using Ayasdi’s software. Each node in the network represents claims with similar characteristics. Nodes that share a claim are connected to each other. Coloring the network to highlight high concentrations of denied claims surfaces hotspots (regions in red) that warrant deeper investigation.

For example, one of the identified hotspots surfaced a cluster of denied claims around colonoscopy screening procedures. Colonoscopy claims are notorious for being rejected on the grounds of lack of medical necessity and providers regularly run afoul of complex coding guidelines. A provider is typically faced with a variety of coding scenarios each of which is often susceptible to inconsistent interpretation of the guidelines by the adjudicator:

• Screening colonoscopy for Medicare patients
• Screening colonoscopy for non-Medicare patients
• Screening colonoscopy for Medicare patients that becomes diagnostic or therapeutic
• Screening colonoscopy for non-Medicare patients that becomes diagnostic or therapeutic

However, using Ayasdi’s machine intelligence software the provider was able to surface a coding scenario and treatment procedures that were common in this group of denials.

Further investigation of the identified features for this hotspot revealed that the issue involved the ordering of the diagnoses codes in the claim and the selection of an inappropriate “G” code or HCPCS code for each colonoscopy scenario. The sequencing of codes triggers the screening colonoscopy as “diagnostic”, thereby impacting how much of the payment is covered or deferred to the patient’s out-of-pocket expense.

The provider anticipates that the use of Ayasdi’s machine intelligence to influence processes changes will help address 70 percent of all denials, thus saving millions of dollars annually.

**THE BENEFITS OF USING AYASDI MACHINE INTELLIGENCE**

**RAPID ROOT CAUSE IDENTIFICATION**

Ayasdi’s machine intelligence software identified denial hotspots and the root cause of commonly denied claims within weeks of the analysis. Traditional approaches to uncovering patterns by analyzing and aggregating denial codes for each individual claim would have taken months.

**COMPREHENSIVE & UNBIASED EXPLORATION**

Ayasdi’s data-first approach eliminated the need to limit the analysis to a predetermined set of features or algorithms. This allowed the provider’s data scientists the ability to analyze all potential attributes of the claim and identify the ones that were highly correlated with denials.

Ayasdi’s software uses the shape of claims data to discover subtle signals as well as small segments of similar claims with a high percentage of denials. By discovering groups of claims with similar reasons for denials, the claims management team can prioritize process improvements based on the revenue impact.

**Summary**

Ayasdi’s machine intelligence software draws on the power of TDA to expedite the discovery of denial patterns within a hospital’s claims data and improve revenue cycle management. Ayasdi’s software helps hospitals identify groups of commonly denied and rejected claims, surface the characteristics of these groups, and use these insights to influence process improvement. Traditional approaches to identifying the causes of denial are rudimentary and require manual investigation of individual claims. Ayasdi’s software provides hospitals with a holistic view of all of their claims data. It discovers highly nuanced relationships between all the variables within claims and their correlation to denials. With a complete picture of the causes for denials, organizations can go beyond just managing denials. They can prevent them.
Ayasdi is on a mission to make the world’s complex data useful by automating and accelerating insight discovery. The company’s Machine Intelligence software employs Topological Data Analysis (TDA), to simplify the extraction of knowledge from even the most complex data sets confronting organizations today. Developed by Stanford computational mathematicians, Ayasdi’s approach combines machine learning algorithms, abundant compute power and topological summaries to revolutionize the process for converting data into business impact. Ayasdi is funded by leading venture capitalists including Khosla Ventures, Institutional Venture Partners, FLOODGATE Kleiner Perkins, Citi Ventures, Centerview, and Draper Nexus. The company counts many of the Fortune 500 as clients.

ABOUT AYASDI

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